

to observing "moraines," "ice-action," "boulders," and "bloc perches" in the same region.

My object in sending these lines to NATURE is to ask for notes of localities where glacial traces may be seen, as an aid to those who hope to examine more closely into the glacial phenomena of Central France.

W. S. SYMONDS

Pendock Rectory, Tewkesbury, March 25

Metachromism

A FEW words of explanation may seem necessary after Mr. Ackroyd's observations (NATURE, vol. xiii. p. 385) on my previous letter regarding the above subject.

The question as to whether a change of composition can be said to *produce* or to *accompany* changes of physical properties, is a matter of words which the chromium series does not affect, as the relative number of atoms of the two elements is the test of arrangement followed.

With regard to the two colour scales—one co-existent with alterations of composition, the other with alterations of temperature—I never wished to "criticise" Mr. Ackroyd's results, but solely to point out a resemblance which I had observed a few years ago, and which I was not aware that that gentleman had noticed. The two series need not necessarily be similar; and, whatever other reasons may exist for placing white in the ultra-violet, the question in hand is not whether the ultra-violet rays produce the same sensation on our eyes as a mixture of all the colours, but, Do the white compounds in question, when spectroscopically examined, *only* show the ultra-violet, leaving the rest of the range in darkness, or do they show a complete spectrum? If the first, then of course their place of classification would be in the ultra-violet; but if they give a whole spectrum (as the compounds do to which I referred), then they must be classed as having an average refrangibility greater than yellow light (because they have blue in addition to it), and less than blue light (because they have yellow also), for the centre of luminosity (on each side of which the total of light rays is balanced) falls in the green.

If we had only to deal with monochromatic substances, then of course the usual *pan-spectral* white would not need to be considered, and green (as Mr. Ackroyd says) would be the only appearance to be classed between blue and yellow.

Thus "the assertion that white comes between yellow and blue" does not "rest upon the colour relation found to obtain between the oxides of the alkali metals," though it is in accordance with the rule given on p. 347, in the six sets of the oxides and chlorides there mentioned; the sole case not agreeing with it being that of the chromium chlorides, which, however, may be accounted for.

As to the orange colour of Na_2O_2 , as Miller does not mention any colour, Turner was referred to; and if he is in error, that one instance may be laid aside; in any case it does not affect the relative natural order of blue and white.

Bromley, Kent

W. M. FLINDERS PETRIE

Socotra

WHEN I wrote the letter to the *Times* about Socotra, alluded to in NATURE, vol. xiii. p. 414, I was not acquainted with the excellent topographical memoir on this island by Lieut. J. R. Wellsted, published in the Geographical Society's Journal for 1835 (Journ. R. Geog. Soc. v., p. 129). After perusing it I am more than ever of opinion that Socotra is well worthy of the attention of the naturalist, and may probably possess many most interesting indigenous plants and animals. Unless matters are very different from what they were in 1834, there can be little difficulty in exploring the island, and if, as we are told, it has really become British property, I trust we may not have to wait much longer for some information about its zoology and botany. "Socotran Aloes" and "Dragon's Blood" are at present almost its only known natural products, and Lieut. Wellsted mentions but one native animal—a species of Civet.

P. L. SCLATER

11, Hanover Square, W., March 27

Coloured Solar Halos

SOLAR Halos such as described by Dr. Frankland (NATURE, vol. xiii. p. 404), may be seen on about seventy-five or eighty days in the year, here, and are commonest in the spring, but it is extremely rare for them to be brightly coloured. I speak

of the ordinary solar halo of about 22° radius, but the great halo of about 46° radius, is always distinctly coloured, though not a common phenomenon. It is not the "murky atmosphere" of London that hides the colours of the ordinary halo; they usually do not exist, except dull red and orange, and perhaps a faint tinge of blue. This is owing to the great breadth of the halo, which causes the colours to overlap and mix together; here it is very seldom that the halo is narrow and the colours consequently bright, as they seem to have been when seen by Dr. Schuster (p. 394). I doubt whether the name "parhelia," which he gave them, is correct; I understand that term to mean mock suns (or a bright small portion of a halo), a phenomenon visible here on thirteen days in a year on the average.

I may add that though I am rather easily dazzled, I find no difficulty in seeing halos with the naked eye.

Sunderland, March 28

T. W. BACKHOUSE

"Euclid Simplified"

MR. MORELL's defence is a curious one, and amounts to this: "If my book is a bad one I am not to be blamed, because I have copied from Amiot, Legendre, and others. If I have made blunders in derivations, &c., again I am not to blame, but to be pitied, because I could not employ better printers." As in our former notice we limited our remarks to a few only of the objectionable features in "Euclid Simplified," so, in our present notice, we shall select a few only of the points put forward in Mr. Morell's letter, though we may observe in passing, that we see no reason to retract any of our previous comments. We think that our readers will agree with us when we state our belief that Mr. Morell has utterly failed in most, if not in all cases, to appreciate the force of our objections. Mr. M. correctly quotes Dr. Wormell (pp. 78-81), but fails to see that his own statement is widely different; had he written "perpendicular to the straight line A A' through its centre" (p. 41), "perpendicular to A B through its middle point" (p. 42), we should not have found fault with him. Again, the reference to Mr. Gerard (p. 310) is not to the point; we can understand what is meant by a "segment capable of a given angle," but we still object to the term "capable angle." The revised definition of a *parallelogram* is now (see text and letter), "a quadrilateral of which the opposite sides are equal and parallel!" We did not object to the term *lozenge*, which is a well-known one, but to the way in which it was introduced.

We turned to Dr. Wormell's definition of *circumference* with some curiosity, and found that (with the exception of "plain" being printed for "plane") it was perfectly right, and that Mr. Morell had again failed to see the point in our citation of the schoolboy's definition. We contend that Amiot's sentence, as quoted by Mr. Morell, does not mean what Mr. M. makes it to mean. Dr. Wormell's use of G. C. M. is perfectly legitimate, but does not warrant, so far as we can see, the use of R for *right angle* (seeing it is conventionally applied to another purpose) unless, indeed, it be explicitly stated in the text that R is so used.

We said (p. 204) that in Theorem VI., p. 148, the reasoning is defective. Mr. Morell replies it "only errs by excess of proof." We will reproduce the "proof," and leave the decision to our readers. "The area of a trapezium A B C D is equal to the product of its height B E by the half sum of its bases A C and B D. Drop the perpendicular B E on A F, and *bisect it by line G H*. Produce the base A C to F, making C F = D B. Then the two triangles D H B and F H C which have for bases the base D B of the trapezium or C F = D B, and which have also the same height, $\frac{1}{2}$ B E, are equal. The area of triangle F H C = $\frac{1}{2}$ D B or F C \times $\frac{1}{2}$ B E; that of triangle D H B = $\frac{1}{2}$ D B \times $\frac{1}{2}$ B E. These triangles, having equal angles, are therefore equal. But," &c. Upon this we remark, we are not told how G H is drawn—the pupil is to infer that it is parallel to B D. Now we must suppose H connected with B and F, and cannot assume that B H F is a straight line, hence, though triangles H F C, B H D are equal, it does not follow that angles F H C, B H D are equal, hence too we cannot assume A B F to be a triangle. But really we must apologise for taking up space with such elementary details. For Mr. Morell's benefit we give the following:—Produce A C to F, making C F = B D, join B F, cutting C D in H, then triangles C H F, B H D are equal, and triangle A B F = A B D C, &c.

Enough has been written on this, in its present form, objectionable book. At any rate we hope that any one who has

thought of introducing the work into school use on the strength of one or two hastily written commendations of it, will be induced in consequence of what we have written, to examine the work for himself. We feel confident that any competent geometer who opens the book at almost any page, will endorse our criticisms, and say "the half was not told." In brief, the definitions are faulty, the enunciations are faulty, the proofs are faulty, and the typography is faulty; if these things do not make a bad book we do not know what does. The defence is, "if the enunciations are loosely and inelegantly worded, Amiot must bear the blame which attaches in greater degree to our translations of Euclid." Alas! poor Amiot! this is an unkind cut,

Mr. Morell!

R. TUCKER

March 6

Bullfinches and Primroses

I HAVE a bullfinch which was hatched last summer after primroses were over. They were therefore quite new to him when I offered him the first I could get this season. He pulled it to pieces quite indiscriminately, biting stalk, flower, or calyx quite indifferently, and the same with a few more which were given to him at the same time. But since then he has often had a few at a time, perhaps twenty or thirty in all, and he now almost always bites out the lower part of the calyx, as described in *NATURE*, vol. ix. p. 482. Sometimes he bites a little too high up, but almost instantly tries again with better success. When that part is eaten he attacks the stalk rather than the corolla.

Last spring I offered primroses to four bullfinches belonging to friends. Not one seemed to pull the flower to pieces according to any method. Two of them I saw only once. Another (an old bird and somewhat shy), after being supplied with the flowers for several days, seemed as unskilful in picking out the bit as he was at first. The fourth was a young bird. His mistress was called away before she had heard what was the peculiarity for which I was watching. A few days later she told me she had been giving him primroses in the meantime, and had noticed that he ate only the green part. In those few days he had learnt the art of primrose eating, not indeed quite perfectly, but wonderfully well considering how little practice he had had.

C. A. M.

Seasonal Order in Colour of Flowers

IT seems that Mr. Thiselton Dyer has thought fit to conclude the different observations made on this interesting subject by copying a part of Sachs's "Text-book." He will, I hope, allow me to point out to him the latest researches respecting the influence of light on the colour of flowers, published by E. Åskensay, in the *Botanische Zeitung*, 1876, Nos. 1 and 2. This author made experiments with several flowers which had sufficient food at their disposal, and found that some of his flowers changed their colour when placed in the dark, while it was not so with others. Therefore it cannot be said that light has no influence. The cause of this difference, observes the author, has as yet not been explained; other experiments will have to be made to clear up this point.

I think the colour of most flowers is a thing that by continued inheritance during a very long lapse of time has become almost constant, and cannot be changed in a few weeks or months. Long-continued experiments with the same flowers and their offspring would, perhaps, show more considerable changes than Åskensay found.

So much for the point referred to by Mr. Dyer.

As to the seasonal order itself, a continuation of Mr. Alexander Buchan's observations would be necessary, and probably also experiments with the several parts of the spectrum to which the flowers are to be exposed.

As this letter was written, I read that of Mr. Wm. Ackroyd (*NATURE*, vol. xiii. p. 366); doubtless every one will expect with great interest his following note.

J. C. COSTERUS

Amsterdam

Plant Fertilisation

SOME short time since I observed a rather curious case of plant fertilisation through the medium of insects, and thinking as the subject is one which is attracting much attention from botanists at present—it might be interesting to some of your readers (more especially perhaps as occurring in this remote part of the world), I take the liberty of forwarding you the particulars in the hope that you can find a corner for them in your valuable journal.

Growing rather abundantly just on the coast here is a small shrub belonging, I believe, to the sub-order Coffeee, having numerous small greenish flowers, the interior of the corolla tube filled with silky white hairs, and the style bent in a peculiar manner, so as to bring it to one side of the tube. I observed the anthers deluse before the flower buds open covering the stigmatic surface (which is simply a thickened continuation of the style) with pollen. I noticed that all the individuals of this species of shrub were visited by a kind of ant in large numbers, and as soon as a flower opened they began pulling out the hairs, lining the corolla tube, and often biting off the stamens also, in order to clear a way down to the nectar contained at the bottom of the tube. In doing so they often support themselves by clinging to the pollen-covered style with their posterior legs. The bend in the style which brings it to the side of the corolla tube prevents it from being an obstruction while they are obtaining the nectar, although, so eager are they to get it even to the last drop, that in a few old flowers I noticed even the style removed. The pollen keeps dry for a considerable time, so that cross-fertilisation is effected by the removal of pollen from the stigma of one flower to that of another.

We have here, therefore, several adaptations of structure and habit to ensure that end. The deluscence of the anthers while in the bud removes the pollen from a part of the flower where it would in all probability be wasted (when the ants bite off the anthers) to another part, where by a peculiarity in its structure, viz., the bend in the style, it is protected and transferred to other flowers. The hairs in the corolla-tube, by rendering the approach to the nectar difficult, and thus making the use of the style as a support needless, also increase the chances of cross-fertilisation.

M. S. EVANS

Durban, Natal, South Africa, Jan. 25

The Visibility of Mercury

PERHAPS some of your readers may, like myself, have been struck with the remarkable brilliancy of Mercury to the naked eye on the evening of January 26. I scarcely ever remember to have seen the planet so well deserving the epithet *στέλεχος*. Since April, 1858 I have noticed it twenty-one times with the naked eye at its evening apparitions. It seems difficult to reconcile the lament of Copernicus that he would die without seeing Mercury with the accounts of his life. The common reason given is, that it was always enveloped, to him, amid the vapours of the Vistula. But he did not pass all his life in that part of Europe. At one time he went to Bologna and stayed with Dominic Maria, a professor of astronomy in that place. After this he proceeded to Rome, where he was made professor of mathematics, and where we find him actually engaged in making observations about the year 1500.

The amateur may look out for Mercury near the western horizon, after sunset, about the following dates:—1877, Jan. 10, April 29; 1878, April 10; 1879, March 26; 1880, March 7; 1881, Feb. 20; 1882, Feb. 2; 1883, May 6; 1884, April 18; 1885, March 31; 1886, March 15.

Tycho Brahe, who could not have enjoyed a very favourable latitude for picking up the planet, gives us the following notes in his "Historia Celestis":—

1585, Nov. 15.—"Apparuit hoc tempore matutino ♀ tanquam rubricunda quædam stella secundæ magnitudinis et mediæ, quasi 2 et 1 magnitudinis."

1590, March 1.—"♀ adamodum apparenter videbatur, instar stellarum prime magnitudinis, aëde ut eam, quæ in dextro humero Orionis est, magnitudine visibili representaret. Si ♂ diametrum visibilem feceris 2½, non inconvenienter se habebit."

1596, March 15.—"Erat hæc vespera apprimè serenum et mediocriter tranquillum. ♀ hæc vespera satis fuit conspicuus quippe cuius quantitas stellam inter primæ et secundæ magnitudinis referebat."

Measurements of the diameter of the planet are best obtained when it is seen in transit on the sun, of which there will be a very favourable opportunity for several hours on May 6, 1878. After this, it is doubtful whether we shall see Mercury on the sun again this century in England, as he passes off the solar disc on May 10, 1891, about half-an-hour after sunrise, and on Nov. 10, 1894, the ingress of the planet is only a few minutes before sunset. For a transit to be seen thoroughly from this country we must wait till Nov. 12, 1907, and Nov. 6, 1914, both of which will be visible throughout here.

SAMUEL J. JOHNSON

Upton Helions Rectory, Crediton, Feb. 21